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Agrément Certificate
93/2967
Product Sheet 1

SEAMLESS ROOFING

PERMADECK 20 ROOF WATERPROOFING SYSTEM

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Permadeck 20 Roof Waterproofing System, a cold-applied, glass fibre reinforced polyester resin for use as a waterproofing system on flat or pitched roofs with limited access. A non-slip version is available for use in verandas, terraces or for walkways on flat roofs.

AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Weathertightness — the system resists the passage of moisture into the building (see section 5).

Properties in relation to fire — tests indicate that the system can enable a roof to be unrestricted under Building Regulations (see section 6).

Resistance to wind uplift — the system resists the effects of any wind suction likely to occur in practice (see section 7).

Resistance to foot traffic — the system can accept the limited foot traffic and loads associated with installation and maintenance of the system without damage (see section 8).

Durability — the system will have a durability in excess of 15 years. A glass fibre reinforced polyester (GRP) laminate formed under satisfactory conditions can maintain its integrity for 30 years (see section 10).

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. The system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

Date of First issue: 24 June 2010

Originally certificated on 30 November 1993

The BBA is a UKAS accredited certification body — Number 1113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, the Permadeck 20 Roof Waterproofing System if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	B4(2)	External fire spread
Comment:		Data to BS 476-3 : 1958 indicate that on suitable substructures the use of the system will be unrestricted under this Requirement. See sections 6.1 and 6.2 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		Tests for water resistance indicate that use of the system meets this Requirement. See section 5.2 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The system is acceptable. See sections 10.1 and 10.2 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The system can contribute to a construction meeting this Regulation. See sections 9, 10.1 and 10.2 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		Data to BS 476-3 : 1958 indicate that the system when applied to a non-combustible substrate, can be regarded as having low vulnerability under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 6.1 and 6.2 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Tests for water resistance of the system indicate that the use of the system will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.7 ⁽¹⁾⁽²⁾ . See section 5.2 of this Certificate.
Regulation:	12	Building standards – conversions
Comment:		All comments given for this system under Regulation 9 also apply to this Regulation, with reference to clause 0.12 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The system is acceptable. See sections 10.1 and 10.2 and the <i>Installation</i> part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The system is acceptable. See section 9 of this Certificate.
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		Tests for water resistance indicate that use of the system will enable a roof to satisfy the requirements of this Regulation. See section 5.2 of this Certificate.
Regulation:	E5(b)	External fire spread
Comment:		Data obtained from tests to BS 476-3 : 1958 indicate that on suitable substructures use of the system can enable a roof to be unrestricted under this Regulation. See sections 6.1 and 6.2 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 2 *Delivery and site handling* (2.2 and 2.5 to 2.7) and 12 *Precautions* (12.1 and 12.2).

Non-regulatory Information

NHBC Standards 2010

NHBC accepts the use of the Permadeck 20 Roof Waterproofing System, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs and balconies*.

The system should only be installed by specialist roofing contractors who have been trained and approved/registered by the Certificate holder. The Registered Contractors' Scheme records will be audited by the BBA as part of its programme of surveillance of the Certificate.

Technical Specification

1 Description

1.1 The Permadeck 20 Roof Waterproofing System consists of a glass fibre reinforced polyester resin, cold applied on site by the hand lay-up process. Permadeck grit can be added to the topcoat resin to provide a non-slip surface.

1.2 The system comprises:

- Permadeck B resin — an unsaturated polyester resin in styrene monomer, modified to allow curing with methyl ethyl ketone peroxide (MEKP), for use as the basecoat resin. A dye is included in the resin, which produces a colour change on curing. The basecoat contains additives to suppress the emission of styrene monomer and protect the basecoat from dirt, moisture and excessive monomer loss prior to the application of the topcoat. A pre-accelerated winter grade is available
- Permadeck T resin — an unsaturated polyester resin in styrene monomer, modified to allow curing with MEKP, for use as the topcoat resin. The coating is supplied clear (translucent white) for use in conjunction with the pigmented paste. A pre-accelerated winter grade is available. The resin can have a slight lightening effect on the colouring
- Permadeck glass mat — 600 g·m⁻² emulsion-bound, chopped strand glass fibre matting conforming to BS 3496 : 1989 used as reinforcement for the B resin
- Permadeck glass mat — 450 g·m⁻² emulsion-bound, chopped strand glass fibre mat conforming to BS 3496 : 1989 used as reinforcement for the B resin and additional reinforcement over areas of potential weakness
- Permadeck catalysts — di-benzoyl peroxide 50 FT powder, and MEKP
- Permadeck pigment — thixotropic colouring paste for Permadeck T resin
- Permadeck grit — 16/24 EMO1 abrasive grit
- Permadeck accelerator — cobalt-ethylhexanoate for converting summer grade resin to winter grade. The accelerator is pre-mixed off-site with the resin so that catalyst and accelerator cannot come into contact.

Permadeck trims

- Sections A, B, C, D and E as preformed details
- Section A (Drip Fascia) — preformed GRP drip fascia
- Section A (Deep Drip Fascia) — preformed GRP deep drip fascia
- Section B (Raised Edge) — preformed GRP edge detail
- Section B (Raised Edge) Deep fascia — preformed GRP edge detail
- Section C (Simulated Lead Wall Cover Flashing) — preformed GRP flashing detail
- Section D (Fillet) — preformed GRP fillet detail
- Section E (Flat trim) — preformed GRP edge detail.

1.3 Quality control checks are carried out on raw materials.

2 Delivery and site handling

2.1 The components of the system are available to registered applicators only through nominated distributors, a list is available from the Certificate holder.

2.2 Permadeck B resin and Permadeck T resin are supplied in 20 kg batch coded drums, the catalyst in 0.5 litre plastic containers and the pigment in 5 kg metal containers.

2.3 Each container bears the marketing company's product name and the BBA identification mark incorporating the number of this Certificate.

2.4 The glass fibre reinforcement is supplied polythene wrapped in cardboard boxes.

2.5 The catalyst and colouring paste should be stored in sealed containers, under dry conditions, in temperatures of between 5°C and 25°C and away from direct sunlight until ready for application.

2.6 The resins are flammable, with a flashpoint below 32°C, and must be stored in accordance with the *Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972*. The shelf-life of the resins is six months and should be stirred thoroughly before use.

2.7 The resins and catalyst are classified as 'irritant' and 'harmful', the catalyst is also an organic peroxide under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP4)*. All registered contractors must make an assessment of the hazards faced by employees (or others) during application of the products. Hazchem information is available from the Certificate holder.

2.8 The glass fibre reinforcement mat, supplied in roll form, must be kept dry.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Permadeck 20 Roof Waterproofing System.

Design Considerations

3 Use

3.1 The Permadeck 20 Roof Waterproofing System is satisfactory for use as a waterproofing layer on flat or pitched limited access roofs. The non-slip additive is used for verandas, terraces or for walkways on flat roofs.

3.2 Installation is carried out only by applicators registered by the Certificate holder, who provide the necessary technical advice and support. It is the responsibility of registered applicators to ensure that all materials used comply with the Certificate holder's specifications and that all site practices are in full accord with the instructions of that company.

3.3 Limited access roofs are defined for the purpose of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc. Where traffic in excess of this is envisaged, either the non-slip additive must be used or special precautions such as additional protection to Permadeck 20 must be taken.

3.4 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. Pitched roofs are defined as those having falls in excess of 1:6.

3.5 When designing flat roofs, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including for example, overall and local deflection and direction of falls. When upgrading existing flat roofs, care should be taken to eliminate ponding water.

3.6 Permadeck 20 should only be applied to plywood substrates 18 mm thick, bond class WBP, or oriented strand board (OSB) with tongue-and-groove edges, and of the correct durability class for the situation of use, as described in BRE Digest 323 *Selecting wood-based panel products*, the relevant requirements of BS 6229 : 2003 or where appropriate complying with *NHBC Standards*, Chapter 7.1. As an alternative, Sterling floor 8 m by 2 m, 15 mm or 18 mm thick tongue-and-groove boards, or, when fully supported, 12 mm thick boards can be used.

4 Practicability of installation

The system should only be installed by installers who have been trained and approved by the Certificate holder.

5 Weathertightness

5.1 To achieve weathertightness it is essential that the coating is correctly applied and the coverage rate used complies with that stated in the manufacturer's literature.



5.2 Results of test data confirm that the system can adequately resist the passage of moisture to the inside of the building and so meet or comply with the relevant requirements of the national Building Regulations:

England and Wales — Approved Document C, Requirement C2(b), Section 6

Scotland — Mandatory Standard 3.10, clauses 3.10.1 and 3.10.7

Northern Ireland — Regulation C4(b).

5.3 The system is impervious to water and will give a weathertight roof covering capable of accepting minor structural movements without damage.

6 Properties in relation to fire



6.1 A system comprising Permadeck 20 applied to an 18 mm thick OSB substrate, when tested to BS 476-3 : 1958, was designated EXT.F.AA.

6.2 The designation of other specifications, eg when used on combustible substrates, should be confirmed by:

England and Wales — Test or assessment in accordance with Approved Document B, Appendix A, Clause 1

Scotland — Test to conform to Mandatory Standard 2.8, clause 2.8.1

Northern Ireland — Test or assessment by a UKAS accredited laboratory, or an independent consultant with appropriate experience.

6.3 The designation for other specifications should be confirmed by test or an assessment carried out by a UKAS accredited laboratory, or an independent consultant with appropriate experience.

7 Resistance to wind uplift

The system has adequate resistance to the effects of wind suction likely to occur in practice.

8 Resistance to foot traffic

The system can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance operations. However, reasonable care is required to avoid damage by sharp objects or concentrated loads. For use on verandas, terraces and walkways on flat roofs, the non-slip additive must be used.

9 Maintenance



The system should be subjected to regular annual inspections and roof drains kept clear as is good practice with all roofing membranes.

10 Durability



10.1 A GRP laminate constructed accordance with the installation guide and formed in satisfactory weather conditions can maintain its integrity for 30 years.

10.2 The results of accelerated ageing tests and the system's performance in use confirm that satisfactory retention of physical properties is achieved. All available evidence indicates that a Permadeck 20 Roof Waterproofing System when constructed in accordance with this Certificate will have a life expectancy in excess of 15 years, provided there is no abnormal movement of the structure and the roof is subject to regular inspections and maintenance.

Installation

11 General

11.1 Application of the Permadeck 20 Roof Waterproofing System is carried out only by applicators registered by the Certificate holder. Application must be carried out in strict accordance with the relevant clauses of the Certificate holder's instructions and this Certificate.

11.2 Registration of applicators by the Certificate holder require that on completion of every project a Quality Statement is completed, confirming that materials and installation comply with the Certificate holder's specification. This will contain site details including weather conditions, humidity, shape and size of area to which the system is to be applied, resin batch numbers and specification details on the quality of the other components. These should be verified as far as possible by the contractor's client.

11.3 The plywood/OSB substrate to which the product is to be applied must be properly prepared in accordance with the Certificate holder's instructions.

11.4 Adhesion to the plywood/OSB will depend on its condition and cleanliness. The board should be dry, sound, and free from loose material or contamination.

11.5 The Permadeck 20 Roof Waterproofing System is a two-coat application of a basecoat, in which is embedded a glass fibre mat, and a pigmented topcoat.

11.6 Catalyst and pigment are added on site to the resin as detailed in Table 1. The amount of catalyst may be reduced slightly when laying in higher than normal temperatures (see section 13.1)

Table 1 Proportions by weight

Basecoat	Basecoat	Topcoat
Catalyst (%)	1-2	1-2
Pigment (%)	-	5
Accelerator (%)	0.2-0.5	0.2-0.5

11.7 All points of potential weakness, such as board joints, changes of direction, ie upstands, gutters, protrusions, should be reinforced using a 75 mm wide strip of 450 g·m⁻² glass fibre reinforcement and the basecoat.

11.8 All roofs greater than 50 square metres or with a linear dimension greater than 12 m must have provision for the expansion and contraction met in service. The Certificate holder's advice should be sought in these instances.

11.9 On completion of any project a copy of the Quality Statement must be passed to the client for retention. This document would be used as evidence of use of the correct materials and site procedures in the event of any future discussions, negotiations or complaints relating to the roof in question.

12 Precautions

12.1 Vapours from the individual components of the Permadeck 20 system, some of which contain styrene monomer, may cause sensitisation and irritation to the respiratory system, eyes and skin. The system should be used only in areas with sufficient ventilation to prevent the build-up of vapour. Contact with the skin, eyes and clothes must be avoided. The manufacturer's instructions and the relevant safety regulations for working procedures must be adhered to at all times.

12.2 The individual components must not be allowed to enter the drainage system.

13 Procedure

13.1 The curing time of the resin is dependent upon temperature and may be modified by adjusting the quantity of catalyst. If the following conditions apply, application should not take place:

- the air or substrate temperature is outside the range of 6°C to 25°C
- conditions could cause surface condensation
- risk of rain, or
- during frost.

13.2 The Permadeck 20 basecoat is prepared on site by mixing Permadeck B resin with the catalyst in the correct proportions immediately prior to application. On adequate mixing, the resin will be opaque throughout and will have a slight pink hue. The catalysed resin has a working time of approximately 15 minutes depending on temperature. The thoroughly mixed basecoat is applied to the prepared substrate at a coverage rate of 1.00 kg·m⁻² using a synthetic lambswool roller to obtain a uniform coating sufficient to fully bond the glass fibre reinforcement to the substrate.

13.3 The glass fibre reinforcement is embedded into the freshly applied basecoat by rolling with a paddle wheel roller until the reinforcement is thoroughly soaked. More of the catalysed basecoat is applied with the synthetic lambswool roller, at a coverage rate of 0.50 kg·m⁻².

13.4 During application the glass fibre should be lapped 50 mm along the length as well as along the width.

13.5 The roof is ready to accept the topcoat when it is sufficiently dry to walk on without disturbing the strands of glass fibre.

13.6 Prior to topcoating the laminate should be checked to ensure uniformity of resin distribution and that no pin-holes exist. All irregularities, eg glass fibre strands not lying flat, ends of trim jointing strips, etc, must be removed with coarse sandpaper. Suspect areas in the laminate should receive a further coat of resin.

13.7 The Permadeck topcoat is prepared on site by fully mixing in the correct proportion of the colour pigmented paste and, immediately prior to application, the required amount of catalyst. It must be ensured during mixing that the catalyst is uniformly distributed throughout the resin. The catalysed topcoat resin has a working time of 15–30 minutes depending on temperature. When thoroughly mixed the topcoat is applied at a coverage rate of 0.50 kg·m⁻² using a fresh synthetic mohair (short pile) roller.

13.8 When the non-slip finish is required it is added to the Permadeck T resin after the pigment paste and immediately prior to the addition of the catalyst. The grit should be added at a rate of 100 grams per kilogram of topcoat resin, and stirred well. The topcoat resin with grit added requires constant stirring during application to ensure that the grit is evenly dispersed. The grit can also be broadcast onto areas that require additional roughness.

13.9 The Permadeck topcoat should be checked for uniformity of colour and any signs of pin-holing. Sub-standard areas should receive a further thin application of Permadeck topcoat.

14 Repair

In the event of damage, repairs should be carried out in accordance with the Certificate holder's instructions. Repairs should be made by cutting out the damaged section and grinding the surrounding area to a roughened, feathered surface extending 100 mm in each direction from the damaged area. The area to be covered should be thoroughly cleaned with a stiff brush. Glass mat and Permadeck B resin should be used to make good the repair, left to harden and, subsequently, colour matched pigmented Permadeck T resin applied. Care should be taken not to coat existing areas of Permadeck T resin.

Technical Investigations

15 Tests

Typical results for the tests are summarised in Tables 2 and 3.

Table 2 Physical properties

Test (units)	Free film	Mean results			Method
		Profiles			
		B	C	D	
Density (g·cm ⁻³)	1.38	1.53	1.52	1.50	ISO 1183
Glass to resin ratio	1:3.6	1:1.6	1:2.2	1:2.2	BS 2782-10.1002
Thickness (mm)	—	1.29	1.05	1.04	Micrometer
Weight per unit area (g·cm ⁻²)	—	1.88	1.39	1.46	Direct measurement
Hardness	27	49	—	—	BS 2782-10.1001
Water vapour permeability (g·m ⁻² ·day ⁻¹) (25°C/75% RH)	1.55	—	—	—	BS 3177
Water vapour resistance (MN·s·g ⁻¹) (25°C/75% RH)	132	—	—	—	BS 3177
Tensile strength (N·mm ⁻²) unaged	63.5	96.3	—	—	BS 2782-3.320E
90 days heat aged at 80°C	59.4	85.0	—	—	
Cross-breaking strength (N·mm ⁻²) unaged	100.7	400	—	—	BS 2782-10.1005
2 hours water boil	84.4	—	—	—	
30 days water soak	102.8	—	—	—	
7 days heat aged at 70°C	114.1	392.6	—	—	
1000 hours UV ageing	115.5	350.8	—	—	
Resistance to water pressure	satisfactory	—	—	—	MOAT 27 : 5.1.4.2

— = not tested.

Table 3 Physical properties — general

Test (units)	Mean results		Method
	Permadeck 20 applied on plywood	Permadeck 20 applied on Sterling Board	
Static indentation	L ₄	L ₄	MOAT 27 : 5.1.9
Dynamic indentation	I ₄	I ₄	MOAT 27 : 5.1.10
Tensile bond strength (N) unaged	5985	6188	<i>ad-hoc</i>
28 days heat aged at 70°C	5490	—	
90 days heat aged at 70°C	5288	—	
Cross-breaking strength (N·mm ⁻²) unaged	1840	—	BS 2782-10.1005
90 days heat aged at 80°C	1816	—	
Resistance to thermal shock	satisfactory	—	MOAT 27 : 5.1.5

— = not tested.

16 Investigations

16.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

16.2 A visit was made to a site in progress to assess the practicability of the installation procedures.

Bibliography

- BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*
 BS 476-3 : 2004 *Fire tests on building materials and structures — Classification and method of test for external fire exposure to roofs*
 BS 2782-3.320A to 320F : 1976 *Methods of testing plastics — Mechanical properties — Tensile strength, elongation and elastic modulus*
 BS 2782-10.1001 : 1977 *Methods of testing plastics — Glass reinforced plastics — Measurement of hardness by means of a Barcol impressor*
 BS 2782-10.1002 : 1977 *Methods of testing plastics — Glass reinforced plastics — Determination of loss on ignition*
 BS 2782-10.1005 : 1977 *Methods of testing plastics — Glass reinforced plastics — Determination of flexural properties — Three point method*
 BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*

BS 3496 : 1989 *Specification for a glass fibre chopped strand mat for reinforcement of polyester and other liquid laminating systems*

MOAT No 27 : 1983 *General Directive for the Assessment of Roof Waterproofing Systems*

ISO 1183 : 1970 *Methods for determining the density and relative density (specific gravity) of plastics excluding cellular plastics*

Conditions of Certification

17 Conditions

17.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

17.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

17.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

17.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

17.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.